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Title: Climate Dynamics Experiments Using a GCM Simulations

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Accomplishments in the past year:

The study of surface-atmosphere interactions has begun with studies of the effect of altering the ocean and land boundaries. A ten year simulation of global climate using observed sea surface temperature anomalies has begun using the NCAR Community Climate Model (CCM1). The results for low resolution (R15) have been computed for the first eight years of the simulation and compared with the observed surface temperatures and the MSU observations of tropospheric temperature. A simulation at higher resolution (T42) has been done to ascertain the effect of an interactive soil hydrology on the system response to an El Nino sea surface temperature perturbation. Initial analysis of these simulations have been completed

Plans for next year:

The results so far have highlighted the difficulties of comparing the results of two highly complicated nonlinear systems, even when they share some considerable similarities and some of the same boundary conditions. We will work in the coming year to develop diagnostic techniques and visualization methods to facilitate this comparison with the goal of developing improved parameterizations in the global climate models. Simulations of the earth system will be made using the GCM and the results compared with climate data sets that currently exist at MSFC, along with new data sets that are developed in the pre-EOS era. Surface hydrology, turbulent interchange at the surface, cloud radiative forcing and surface radiation balance are the processes that will be initially investigated. This work will support NASA objectives within EOS, TOGA-COARE, TRMM, ISCCP, and will enhance our understanding of the coupling between the atmosphere and its boundaries.